

WHAT IS CLAIMED IS:

1                   1.     A robotic surgical tool for use in a robotic surgical system having a  
2     processor which directs movement of a tool holder, the tool comprising:  
3                   a probe having a proximal end and a distal end;  
4                   a surgical end effector disposed adjacent the distal end of the probe;  
5                   an interface disposed adjacent the proximal end of the probe, the interface  
6     releasably coupleable with the tool holder; and  
7                   circuitry mounted on the probe, the circuitry defining a signal for  
8     transmitting to the processor so as to indicate compatibility of the tool with the system.

1                   2.     The robotic surgical tool of claim 1, further comprising a sterile  
2     adapter releasably mounted to the tool holder, the adapter coupling the tool holder to the  
3     interface, wherein the circuitry transmits the signal to the processor of the robotic surgical  
4     system via the adapter.

1                   3.     The robotic surgical tool of claim 1, wherein the signal comprises  
2     unique tool identifier data.

1                   4.     The robotic surgical tool of claim 3, the processor of the robotic  
2     surgical system including programming to manipulate the tool identifier according to a  
3     predetermined function so as to derive verification data in response to the tool identifier,  
4     wherein the signal transmitted to the processor further comprises the verification data.

1                   5.     The robotic surgical tool of claim 1, wherein the signal comprises  
2     an identifier signal included in a table accessible to the processor for comparison with the  
3     signal, the table comprising a plurality of compatible tool identification signals.

1                   6.     The robotic surgical tool of claim 1, wherein the signal comprises  
2     an arbitrary compatibility data string.

1                   7.     The robotic surgical tool of claim 1, wherein the probe body  
2     comprises an elongate shaft suitable for distal insertion via a minimally invasive aperture  
3     to an internal surgical site of a patient body.

1                   8.     The robotic surgical tool of claim 1, wherein the end effector is  
2     adapted for manipulating tissue, and further comprising a wrist joint coupling the end

effector to the shaft for varying an orientation of the end effector within the internal surgical site.

9. The robotic surgical tool of claim 1, wherein the end effector defines a field of view, the probe comprising an image capture device.

10. A robotic surgical component for use in a robotic surgical system having a processor and a component holder, the component comprising:  
a component body having an interface mountable to the component holder, the body supporting a surgical end effector;  
a drive system coupled to the body, the drive system moving the end effector in response to commands from the processor; and  
circuitry mounted on the body, the circuitry defining a signal for transmitting to the processor, the signal comprising at least one member selected from the group consisting of compatibility of the component with the system, a component-type of the component, coupling of the component to the system, and calibration of the component.

11. The robotic surgical component of claim 10, wherein the component comprises a tool including a shaft having a proximal end and a distal end, the end effector disposed adjacent the distal end of the shaft, with a plurality of degrees of motion relative to the proximal end of the shaft, and wherein the interface comprises a plurality of driven elements, and further comprising a tool drive system coupling the driven elements to the degrees of motion of the end effector, the tool drive system having one or more calibration offsets between a nominal position of the end effector relative to the driven elements and a measured position of the end effector relative to the driven elements;

wherein the circuitry comprises a memory storing data indicating the offsets, the memory coupled to the interface so as to transmit the offsets to the processor.

12. A robotic surgical tool for use in a robotic surgical system having a processor which directs movement of a tool holder, the tool comprising:  
a probe having a proximal end and a distal end;  
a surgical end effector disposed adjacent the distal end of the probe;







second axial position, and wherein each of the driven elements has a limited angular rotation.

27. A robotic surgical tool for use with a robotic manipulator having a tool holder, the tool holder having magnetically actuatable circuitry, the tool comprising;  
a probe having a proximal end and a distal end;  
a surgical end effector adjacent the distal end of the probe;  
an interface adjacent the proximal end of the probe, the interface releasably coupleable with the holder, the interface comprising a magnet positioned so as to actuate the circuitry of the holder.

28. A robotic surgical system comprising:  
a processor;  
a tool having a surgical end effector; and  
a robotic manipulator coupling the tool to the end effector;  
wherein the processor senses coupling of the tool to the manipulator by at least one member selected from the group consisting of:  
a signal from a memory circuit of the tool;  
a signal from a memory circuit of an adapter coupling the tool to the manipulator; and  
a signal from a magnetic switch that is magnetically actuated by a magnet of the tool.

29. A robotic system comprising:  
a robotic manipulator having a tool holder, the manipulator moving the holder in response to signals from a processor;  
a tool having a surgical end effector;  
an adapter coupling the tool to the holder, the adapter maintaining sterile separation between the tool and holder;  
a first sensor disposed adjacent the holder, the first sensor transmitting a first signal to the processor in response to coupling of the adapter to the holder; and  
a second sensor disposed adjacent the holder, the second sensor transmitting a second signal to the processor in response to coupling of the tool to the adapter.

1                   30.     The robotic surgical tool of claim 3, wherein the signal further  
2 indicates at least one of tool life and cumulative tool use by a measurement selected from  
3 the group consisting of calendar date, clock time, number of surgical procedures, number  
4 of times the tool has been coupled to the system, and number of end effector actuations.

1                   31.     A robotic surgical system comprising:  
2 a tool having circuitry containing verification information;  
3 a coupler for coupling the tool; and  
4 at least one system processor for receiving the verification information  
5 from the tool coupled to the coupler, said at least one processor further manipulating the  
6 information with an algorithm to produce output information, comparing the output  
7 information to predetermined data to verify compatibility of the tool with the robotic  
8 surgical system, and enabling the robotic surgical system to manipulate the tool if the  
9 output information matches the predetermined data.

1                   32.     The system of claim 31, wherein said verification information and  
2 said predetermined data are unique to said tool, and said predetermined data are contained  
3 in said circuitry on said tool.